

**Abstract**

The present invention is in the area of biomaterials, i.e. materials that are used in contact with living tissue and biological fluids for prosthetical, therapeutical, storage  
5 and the like. In particular, the invention relates to a novel approach of creating biocompatible surfaces, said surfaces being capable of functionally interacting with biological material. Said biocompatible surfaces comprise at least two components, such as a hydrophobic substratum and a macromolecule of hydrophilic nature, that cooperatively form a novel biocompatible surface. The novel approach is based on  
10 contacting said hydrophobic substratum with a laterally patterned monomolecular layer of hydrophilic and flexible macromolecules that exhibit a pronounced excluded volume. The surface is, in respect to polarity and morphology, a molecularly heterogeneous surface. Structural features of said macromolecular monolayer (as e.g. the layer thickness or its lateral density) are determined by, i) the structural features of  
15 the layer forming macromolecules (as e.g. their MW or their molecular architecture) and, ii) the method of creating said monomolecular layer (as e.g. by physi- or chemisorbing, or by chemically binding said macromolecules). The structural features of the layer forming macromolecule(s) is in turn determined by synthesis.